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# *extension review*

United States Department of Agriculture Summer 1986



**Cooperative  
Extension  
System**

Inside...  
The Environment

## Introducing Our New Logo

We're proud and pleased to introduce the new logo or symbol for our nationwide network the Cooperative Extension System: a first for our organization since it began in 1914. The logo, a striking graphic triangle, symbolizes the strong, equal partnerships within our system—federal, state and county and Extension, research, and the private sector. The triangle also symbolizes change and knowledge.

The last three pages of this issue include a "Logo Description and Usage Sheet," with examples of how the logo can be used on state materials. □



## New Mexico 4-H'ers Gift President Reagan

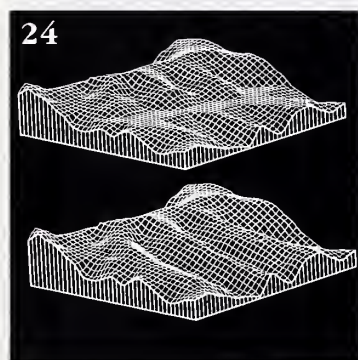
President Ronald Reagan test fits his new green corduroy "Honorary 4-H Member" jacket, emblazoned with a 4-H clover emblem, and presented to him by Senator Pete V. Domenici (Republican, New Mexico) on a recent White House visit.

Senator Domenici presented the jacket to the president at the request of the five member New Mexico 4-H delegation who were visiting Washington, D.C. while attending the National 4-H Conference held May 8 and 9 at the National 4-H Center in Chevy Chase, Maryland.

The New Mexico delegates—Lucy Rush, 4-H youth leader, Taos; Kathy Keith, Tucumcari; Melinda McNeill, Bluewater; Patricia Metheny, Albuquerque; and Sarah Sayles, Mesquite—had the president's name embroidered on the jacket in advance of their visit but were unable to see him to personally gift him with it. While visiting Senator Domenici they asked him if he would present it to the president. Shortly after their



"4-H Day On The Hill" the 4-H'ers were informed by the senator's office that the president had received the jacket and worn it briefly. The New Mexico 4-H'ers were elated, and so were the other 333 delegates to the National 4-H Conference. □



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# Fit To Drink

## 4 Extension Review

*Joe Maknch  
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Groundwater in Pennsylvania is an important natural resource—a resource Pennsylvanians have tapped. They use about three-quarters of a billion gallons of groundwater each day. And almost half of that groundwater is for drinking supplies that demand high-quality, uncontaminated water.

### **Groundwater Contamination**

Sometimes, however, groundwater pumped from wells or drawn from springs is not suitable for human consumption. Naturally occurring substances in the earth, various land use activities, and improper well or spring construction can all cause poor quality water to flow from the household tap. For rural residents with private, individual water systems this may pose a problem.

"People with their own water systems are responsible for ensuring the quality of their water," says Karen Mancl, Extension water specialist, Department of Agricultural Engineering at Penn State University. "And providing safe drinking water for your family can sometimes be a complicated and confusing affair."

### Safe Drinking Water Clinics

To help fill the information needs of people with their own water supplies, Extension water quality specialists have been conducting Safe Drinking Water Clinics throughout the state. Initial support for the program was provided in part through Renewable Resource Extension Act funds.

These clinics are run through the county Extension offices and offer several different presentations on water quality topics, one-to-one consultations with Extension water specialists, and an opportunity to purchase (at cost) a *Water Supply Records* book.

"Keeping good records is essential to managing your water supply," explains Bill Sharpe, Extension water resource specialist with the School of Forest Resources and the Institute for Research on Land and Water Resources, Penn State University. "We developed this book as an aid to management. It contains materials on water supply management, but probably more important, its loose-leaf format provides a means for people to file information, such as well logs or water test results, that is specific to their system. Having access to these types of water supply records makes it easier to handle problems that may crop up in the future."

The water clinics also feature displays by water treatment equipment companies and the presence of local water testing laboratories that offer a package of water tests at a reduced rate. These tests are tailored to the particular water quality problems of the county.

### Pilot Clinic

In May 1984, the pilot Safe Drinking Water Clinic was held in Indiana County, Pennsylvania. The purpose of the clinic was to provide people with information about water supply management and to encourage them to take action to actively manage their water systems.

Spurred by water quality problems stemming from coal mining and gas drilling, Indiana County agent Ward Stover worked with Extension water specialists to organize the clinic. "I became particularly interested in water quality problems as a result of a county dairy study," says Stover.

"We found that poor quality water was one of several factors hurting milk production. That study got me thinking about the importance of uncontaminated water."

To help put the clinic together, Stover worked with a water program planning committee. "They were a group of citizens interested in helping us develop an education program on water quality," he says. "With their knowledge of county residents' water quality concerns, they were a valuable resource."

### Evaluation

Several months after the clinic, Extension staff sent an evaluation questionnaire to each of the 104 participants to assess how well the clinic's objectives were met and to gather information to help plan future clinics.

The questionnaire was designed with assistance from Nancy Ellen Kiernan, program evaluation specialist with the Department of Rural Sociology, Penn State University, to be—in form and content—as unimposing as possible.

The survey was conducted in four stages. In the first stage, all participants were sent the booklet-form questionnaire; an addressed, postage-paid return envelope; and a cover letter asking for participation in the survey. A week later the group received a reminder postcard. This boosted the return rate from 25 percent for the original mailing to 48 percent.

Two weeks after the second mailing, those who hadn't responded were sent another survey and return envelope along with a new cover letter. The response rate increased to 63 percent. Finally, a new reminder postcard was sent and served to make the final response rate 69 percent.

### Results

The evaluation survey indicated that the clinic did meet the stated objectives: People received new and useful information. For example, 51 percent of the respondents learned how often to run water tests for bacteria and nitrates. And participants were also prompted to take some management actions: 58 percent had their water tested and 39 percent began organizing their water supply information in one place.

As an added bonus, respondents indicated that as a result of attending the clinic they were able to save, collectively, nearly \$500 on their water supply management costs.

### The Future

Safe Drinking Water Clinics are continuing to be held throughout the state. And by refining the clinics based on evaluation surveys, Extension is ensuring that rural residents of Pennsylvania get the assistance they need to enjoy the benefits of pure, clean water. □

## Penn State Drinking Water Survey



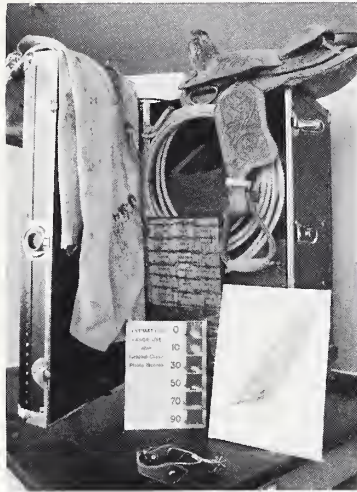
*Opposite: Is her glass of water fit to drink? Sometimes water from Pennsylvania's rural springs or wells is unfit for human consumption.*

*Above: Poster promotes the Safe Drinking Water Clinics being held throughout the state by Extension water quality specialists.*

# Building The Land Ethic

## 6 Extension Review

**Don Floyd**  
Assistant Extension  
Specialist  
Division of Range  
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*Left: A range travelling trunk serves as a teaching aid for Arizona's elementary school teachers. Extension specialists, funded through the Renewable Resources Extension Act (RREA), use the trunks for classroom programs on Arizona's rangelands. Right: Arizona teachers, attending the fifth annual Natural Resources Workshop for Educators sponsored by Extension, study wildlife in the field.*

Two important factors influence Extension rangeland programs in Arizona. Eighty-five percent of land within the state is managed by federal, state, or tribal governments and about 86 percent of all land within the state is rangeland.

From the desert grasslands and saguaro cactus forests along the Mexican border to open pine forests and sagebrush plateaus north of the Grand Canyon, Arizona's citizens rely on rangelands to provide water, forage, recreation, fuelwood, and wildlife.

Cooperative Extension provides the educational materials and technical expertise Arizonans need to make wise decisions about management of public and private rangeland resources.

Arizona's Extension range programs have two major emphases —(1) providing general range educational programs for youth and adults, and (2) providing technical information and assistance in rangeland management.

### Reaching New Residents

Arizona's rapid population growth in the last decade means many new residents who are unfamiliar with deserts, mountains, and public lands. One of the challenges facing Extension is finding new ways to reach urban audiences with messages about multiple-use management of public lands.

Through funding made available by the Renewable Resources Extension Act (RREA), Arizona Extension promotes public land stewardship with traveling trunks for classroom programs, television public service announcements, pamphlets on rangeland etiquette, posters stressing the multiple uses of rangelands, and a traveling exhibit.

In 1985, Extension specialists, funded through RREA, provided more than 50 classroom programs on Arizona's rangelands and, in cooperation with the Coconino County Schools and Resource Center for Environmental Education, developed an elementary school curriculum for rangeland education.

Teaching urban adults about public land stewardship and the "land ethic" is an important focus of the RREA project. Last year Extension distributed almost 5,000 copies of a pamphlet on rangeland etiquette to those who hunt, fish, sightsee, and birdwatch. The Arizona Game and Fish Department, Arizona Department of Public Lands, and U.S. Forest Service assisted in this project.

Currently, RREA is attempting to establish a relationship with urban audiences through radio and television.

In 1986, the Extension range program will sponsor the fifth annual Natural Resources Workshop for Educators. This week-long workshop has trained more than 130 Arizona primary and secondary school teachers in the art and science of multiple-use management.



Extension Wildlife and Range Specialist John Stair recently contributed more than 30 educational activities on rangeland wildlife and plants to the *Arizona Teachers Resource Guide for Environmental Education*. The guide has been distributed to teachers and youth leaders throughout the state.

### Maintaining Strong Relationships

The second component of Arizona's Extension range program maintains the traditional strong relationship with livestock producers and public land managers. Range specialists and county Extension agents are working with livestock producers and public land managers in developing allotment management plans and in establishing joint rangeland monitoring projects to evaluate the effectiveness of management programs on public lands.

Extension is involved in 10 long-term monitoring projects throughout the state in cooperation with ranchers, the Soil Conservation Service, State Land Department, Bureau of Land Management, and the U.S. Forest Service.

Extension Specialist George Ruyle is working closely with the U.S. Fish and Wildlife Service in developing cooperative management plans for the recently acquired Buenos Aires Ranch, which provides critical habitat for the masked bobwhite quail, an endangered subspecies.



Ruyle also arranges and coordinates workshops for livestock producers and agency personnel on increasingly important public land policy subjects such as cooperative management, land-use planning requirements, and rangeland monitoring methods.

*Left: Posters emphasize the multiple uses of rangelands as part of Arizona's RREA project. Right: Two Arizona teachers closely examine the soil at the Natural Resources Workshop for Educators.*

In cooperation with the U.S. Forest Service, a rancher cooperator, and the Department of Animal Science at the University of Arizona, range management research and Extension faculty are active in a research and demonstration grazing study at the Santa Rita Experimental Range, south of Tucson. This project, under the supervision of Extension Specialist Phil Ogden, is designed to develop effective grazing systems on Lehman lovegrass pastures for cattle.

By maintaining strong programs for traditional Extension clientele and developing new methods and programs for urban youth and adult audiences through RREA, Arizona's Extension rangeland program is building a land ethic which helps Arizona citizens face the issues of changing demands for public and private rangeland products, rapid growth, and resource management. □

# Cleanup Time For Lake Okeechobee

## 8 Extension Review

Charles T. Woods  
Extension Associate  
Editor  
Institute of Food and  
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University of Florida,  
Gainesville



Most of the 108,000-acre Taylor Creek-Nubbin Slough Basin—containing about 53,000 cattle—is located in Okeechobee County. An experimental clean water project at the basin has as its goal a 50 percent reduction in phosphorus and nitrogen entering Lake Okeechobee, a main water source.

In Okeechobee County, Florida, where cattle outnumber people by more than four to one—93,000 cows to 22,000 people—animal waste is contributing to the decline of water quality in Lake Okeechobee, Florida's largest fresh water lake.

While past efforts to contain waste in lagoons have not been entirely successful, farmers now believe a new cleanup and recycling program will help keep waste nutrients out of the lake and on the farm where they can be utilized on pastures.

Earlier this year, the Taylor Creek/Nubbin Slough Rural Clean Water Project Field Day, sponsored by Extension at the Institute of Food and Agricultural Sciences (IFAS) provided Okeechobee farmers with an opportunity to see different waste management systems in operation. Lake Okeechobee is the main water source for five cities around the lake and it's a secondary source for much of the lower east coast of Florida. "It's also an important recreational and commercial fishery resource," says Barry Baldwin, Extension agricultural engineer with the University of Florida's Institute of Food and Agricultural Sciences (IFAS).

Studies by the South Florida Water Management District (SFWMD) have shown that concentrations of phosphorus and nitrogen—the most troublesome components in animal waste—are major contributors to the degraded water quality of the lake.

"Because of the vast potential for damage from animal waste, it is important to develop agricultural best management practices (BMPs) that will help control nutrient runoff to the lake and retard the process of eutrophication. Eutrophication is a natural aging process of a lake induced by inputs of nutrients by man or by natural decomposition," Baldwin explains.



### Runoff Problems

Many types of runoff are contributing to the eutrophication of the lake. Runoff from the Taylor Creek/Nubbin Slough Basin, which accounts for only 4 percent of the total flow into the lake, contributes 30 percent of the total phosphorus and a significant amount of the lake's nitrogen loadings, according to Vickie Hoge, IFAS Extension Agent in Okeechobee County.

Moreover, Hoge adds: "A major portion of these nutrients have been attributed to dairy operations where animals have been permitted to wade freely in streams and other bodies of water to relieve heat stress that limits milk production." The

basin includes 108,000 acres with 24 dairies containing 28,000 cows as well as 56 cattle ranches containing 25,000 beef cattle.

Following the passage of the Rural Clean Water Program by Congress in 1979, 13 experimental clean water projects were initiated across the nation. The \$1.3-million Taylor Creek/Nubbin Slough Basin project is one of them, providing financial incentives to farmers to install BMPs to reduce nutrients entering the lake. Goal of the project is a 50-percent reduction in the amount of phosphorus and nitrogen entering the lake through the S-191 control structure operated by SFWMD on the north shore of the lake.

### BMPs In Action

The overall project is administered by the USDA's Soil Conservation Service (SCS) and the Agricultural Stabilization and Conservation Service (ASCS), which signs cost-sharing contracts with farmers for installation of various BMPs. In addition, SFWMD and IFAS are responsible for water quality monitoring and educational programs associated with the project.

Hoge says all dairies in the Taylor Creek/Nubbin Slough Basin are now under contract to begin installing BMPs, and it is expected that 89 percent of all farms will be participating in the program by July 1986.

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*Bob Rydzewski, manager of the Roger Melear farm, a 1,350-acre dairy spread located in the Nubbin Slough Basin, is a firm believer in the new waste nutrient irrigation system designed to return waste nutrients to the pasture. Other Okeechobee dairies are participating in this cost-sharing program.*

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One of 52 sprinklers at the Melear farm being used for irrigation. Part of the cost of this IFAS demonstration project is funded by the federal Rural Clean Water Program.

Recommended BMPs include (1) stream protection by fencing cattle away from waterways, (2) shifting cattle from pasture to pasture to reduce concentrations of wastes, (3) collection of wastes from holding areas around barns for recycling on pastures, and (4) collection of barn wash in lagoons or reservoirs for recycling on pastures.

### New Irrigation System

The 1,350-acre Roger Melear Farm was the first of many large dairies in the basin to begin using a new sprinkler irrigation system designed to return to the pasture phosphorus, nitrogen, and other waste nutrients collected at primary and secondary lagoons.

Bob Rydzewski, manager of the farm, reports that 1,100 cows are milked daily at his farm. Manure from the milking barn is flushed into a 7-acre reservoir where solids are allowed to settle. A 50-horsepower electric pump delivers the nutrient-rich waste water from the reservoir to the pasture through a 6-inch pipe. Four-inch pipes then connect 52 irrigation sprinklers permanently installed on an 80-acre pasture. Two sprinklers can be operated at the same time, covering about 1 acre with effluent.

The system, including reservoir construction, cost about \$45,000, with 75 percent of the total being paid by the ASCS under the federal Rural Clean Water Program.

### Participating Dairies

Other Okeechobee County dairies are participating in the cost-sharing program. One dairy has installed a large center pivot irrigation system that can spread waste effluent over a 200-acre hayfield. Another dairy using a large traveling gun system while a third is using waste effluent to fertilize ornamentals in its diversified operation.

"Prior to this, animal waste was just a nuisance. Now we have an opportunity to capture valuable nutrients—especially nitrogen, phosphorus, and potassium—and return them to the soil, completing the natural cycle," Rydzewski says.

"Instead of feeding green chop and hay, we're producing haylage—a stored forage from wilted grass silage—in our new oxygen-limiting silo," he points out. "We're hopeful haylage will be the high-quality forage we need to produce milk economically. Of course, we're saving on fertilizer costs by recycling our waste nutrients for crop production."

### Sampling Nutrient Levels

To measure nutrient levels in the effluent at the Roger Melear Farm, Barry Baldwin and Roger Nordstedt, both associate professors in the IFAS Agricultural Engineering Department, Gainesville, are analyzing samples taken at random locations in the irrigated pasture.

Data indicates nitrogen levels in the effluent are 16 to 22 pounds per acre inch. Based on these measurements, Baldwin says application of around 25 inches of effluent per year should provide an excellent nitrogen supply for forage crops.

"This project demonstrates how animal wastes can be utilized," Baldwin concludes, "to protect the environment and improve economic returns for Florida's livestock industries." □

# CTIC—Conservation Educator

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Conservation tillage, and especially no-till, is a complicated farming technique. Producers who have successfully switched to this new technology have combined several components through a sound management plan. They use chemicals precisely, often with contingent plans, monitor pest and disease possibilities, plan machinery needs, perform soil tests, evaluate the situation, and revise the plan as needed. Farmers often use the time saved from not tilling to manage the farm business.

Conservation education programs, such as those of Extension, combined with the appropriate disciplines, help bring together the essential components for successful conservation tillage systems.

Because conservation tillage is complex, more can be accomplished when all interested parties work together. One such example is that of the Conservation Tillage Information Center.

## A Focus For Cooperation

The Conservation Tillage Information Center (CTIC) began in January 1983 as a cooperative project among agribusiness, private organizations, and government agencies. Its purpose is to gather and share information that will encourage the adoption and effective use of conservation tillage on our nation's croplands. CTIC is supported by government agencies through their staff contributions, by agribusinesses and foundations, and from sale of CTIC products. It is a nonprofit organization sponsored by the National Association of Conservation Districts (NACD) as a special project. CTIC has helped focus national attention and awareness on the role of conservation tillage in soil and water conservation.

## Cooperation With CTIC

USDA-Extension Service's liaison to CTIC coordinates Extension involvement and activities. Three people have served as liaison: James Morrison, Extension agronomist, Purdue University; James Bauder, Extension agronomist, Montana State University; and G. Morgan Powell, Extension agricultural engineer, Kansas State University.

Additionally, many state and area specialists and county agents support CTIC through their contributions as resource specialists and as contributors to the annual acreage survey.

Extension personnel helped formulate the plans and objectives of CTIC. CTIC works with Extension and other organizations, particularly USDA's Soil Conservation Service, to advance the practice of conservation tillage.

For example, Soil Conservation Service staff member Bruce Julian has been assigned to the

CTIC Ft. Wayne office since it began. Other SCS employees contribute to the acreage survey and as resource specialists.

## CTIC Supports Conservation Education

CTIC staff support Extension education efforts by performing tasks which Extension could not do. The annual acreage survey, for example, is the best information available on the rate of adoption of conservation tillage.

The survey contains details of conservation tillage adoption that are available to virtually everyone. Extension uses the survey in education programs and in program and accomplishment reports. CTIC also has compiled a reference file of Extension publications on conservation tillage and water quality. References complete with abstracts and sources are sent to those who seek information on specific subjects. CTIC's resource specialist file is a valuable tool for referring people with questions back to their local area. (Extension specialists are often the most frequently listed in this file.)

## Adopting Conservation Tillage

The CTIC has helped focus national attention on the role of conservation tillage in soil and water conservation. With CTIC's help, substantial progress has been made nationwide toward the goal of encouraging adoption of conservation tillage.

The 1985 National Survey of Conservation Tillage Practices shows about 31 percent conservation tillage and 5 percent no-till. Comparing these numbers with the projected adoption curve for conservation tillage made in 1975 by USDA shows that conservation tillage is about "on target." However, for no-till, the projection showed about 10 percent for 1985 so adoption lags the projection by about 5 years.

Conservation tillage offers a practical and workable solution to an often-asked question—how can erosion be controlled without prohibitive costs to the producer? Many feel it is the best hope to substantially reduce nonpoint source pollution from agricultural cropland in the short term. However, conservation tillage represents one part of an integrated conservation system which also includes conservation structures, contour farming, crop sequences, and maintenance. A well-planned integrated conservation system lets the farmer control soil erosion and most associated pollutants. □

*G. Morgan Powell  
Extension Liaison,  
National Association  
of Conservation  
Districts  
Conservation Tillage  
Information Center  
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# Broiler Waste Goes To Work

## 12 Extension Review

J. Ross Harris, Jr.  
Extension  
Environmental Quality  
Specialist  
Environmental Control  
Department  
University of  
Delaware, Dover



In the early 1980s, research cast a revealing spotlight on nitrate contamination of ground-water. Agriculture, one of the major sources of this contamination, was contributing through overuse of fertilizer and improper storage and use of manures—particularly broiler manure. Delaware poultry growers produced 204 million broilers generating 228,000 tons of manure.

Delaware's broiler industry is located in a coastal plain which has a high water table and relatively sandy soils. Its water-bearing stratum is a major source of the state's drinking water.

Until Extension involvement in the early 1980s, the land was used as a disposal site for manure, with fertilizer being used as the nutrient source for crops. Extension developed a nutrient management program to focus on the problem of manure mismanagement. The management program, called MANURE (for Managing Agricultural Nutrients Utilizing Resources Effectively), began by emphasizing that broiler manure was a fertilizer and that through proper use and storage the nitrate inputs in groundwater could be substantially reduced. Also, such usage would reduce the need for commercial fertilizers, proper management could protect the environment as well as the farmer's pocketbook.

### Management Program

The program consisted of analyzing the manure to determine the fertilizer value, calibrating the manure spreaders, and answering questions relating to manure management on crops in the field.

Traditionally, manure was stockpiled outdoors and exposed to the elements for up to 10 months. This practice wasted valuable nutrients and made the site useless for cropping for at least 2 or 3 years because of excess salts.

By developing an inexpensive and simple manure storage practice, farmers were able to eliminate these problems. The recommended method involved covering the stockpiled waste with polyethylene tarp anchored with old tires. The plastic keeps the manure dry and prevents runoff and leaching of nitrogen and other nutrients.

Because broiler manure is highly absorbent, covering it also reduces handling costs and equipment wear.

### Substantial Reductions

To put these findings into action on the farm, in 1984 Extension specialists began a cost share program for farmers as an educational tool. The program allows farmers to receive assistance through the Agricultural Stabilization and Conservation Service for the cost of the plastic tarps and for nutrient analyses of the manure.

Participants in the program work with the Extension Service on soil testing, calibrating manure spreaders, and developing an entire nutrient management plan for the farm. Most farms participating in the program substantially reduced net fertilizer costs per acre, without sacrificing yields.



Opposite: J. Ross Harris, Jr.,  
Extension environmental  
quality specialist, (left)  
discusses reduced fertilizer  
costs with Roland Hill, a grain  
farmer who is obtaining a  
savings by using broiler  
manure as a fertilizer source  
on his corn acreage. The tarp-  
covered manure pile behind  
them, a storage practice  
developed by Extension, keeps  
the manure dry and prevents  
runoff and the leaching of  
nitrogen and other nutrients.  
Above: Hill and Harris use a  
calibrating manure spreader  
on Hill's 60 acres of corn.

During 1984, 15 operations actively participated in the manure storage program. In addition, another 40 farms annually participated in managing the broiler manure as fertilizer.

#### A Fair Savings

In 1980, a grain farmer, Roland Hill, began using poultry manure from his son's broiler operation. Unfamiliar with the nutrient content of manure, he spread it on corn along with commercial fertilizer and watched the crop burn up in mid-August.

The next year a management plan was developed that reduced fertilizer costs by \$40 per acre. Without any commercial fertilizer he still realized a 95-bushel-per-acre yield on dry land corn in a dry year.

"On 60 acres of corn, that's a fair savings! At the price grain is now, we'd be going in the red every year if we had to put on all commercial fertilizer," Hill states.

In 1984, Hill no-tilled his corn with poultry manure and obtained 140 bushels dry weight per acre dry land corn. He used no starter fertilizer,

but otherwise followed the standard no-till production recommendation of the Delaware Extension Service.

#### A Popular Source

Each year increasing numbers of farmers are turning to broiler manure as a partial or complete source of fertilizer. Broiler manure is becoming harder to obtain, thus emphasizing the change that has occurred in the thinking on its use.

Because of this change, less manure is being lost to the environment and improved profitability has also resulted for some Delaware farmers.

Two of the farmers in the program have been awarded the State of Delaware's Environment Award for outstanding achievement and progress in solving environmental pollution problems and improving the overall environment. It is farmers like these that prove a voluntary educational system can work in solving environmental problems. □



# Coastal Erosion: Battle For The Great Lakes

14 *Extension Review*



**Stephen R. Stewart**  
*District Extension Sea  
Grant Agent  
Michigan State  
University, East  
Lansing*

For beach dwellers, erosion is more than a natural element of coastal dynamics. Erosion can become the destroyer of homes, the taker of land, and the catalyst that can turn dreams into nightmares.

In Michigan, half of all counties are coastal. The Great Lakes dominate many aspects of the lives of those who live there.

The District Extension Sea Grant agents of the Michigan Cooperative Extension Service have acted to provide information to Michigan's coastal residents who face critical questions concerning erosion. The principal challenge in terms of educational methodology, however, has been that only five field staff are available to cover the 3,200 miles of Michigan coast.

Extension faced the problem of how to provide individual attention to many shoreline property owners in a time-effective manner. In the past, meetings which focused on

erosion and its control were always well attended, but the depth of subject matter coverage within this context was too limited to enable the questions of individuals to be answered adequately.

Because of the large number of coastal residents, individual site visits were simply not practical. And the use of written reference materials alone helped to familiarize people with the basic concepts, but again did little to answer personal questions.

Last summer, to assist shoreline property owners in selecting appropriate control management approaches, Michigan Extension began using a specially developed computer model and follow-up workshops.



### The Computer Model

Work began on the computer model in 1984. By fall, the initial version was ready for review and field testing by District Extension Sea Grant agents in different parts of the state. Results of these preliminary applications, along with comments from university and agency experts, led to a working version that was ready to put an extensive test during the summer of 1985.

The model, which requires information from individual property owners, was based on the analysis of site-specific property characteristics, as well as financial and property-use considerations.

One coastal county along southern Lake Huron was selected to be the focus of the 1985 project, based on its number of residents in identified "high risk erosion areas,"—those areas exhibiting an average annual erosion rate of at least one foot per year.

The District Extension Sea Grant agent for southeast Michigan worked with 418 property owners, together representing some \$20 million in real estate, through a series of contacts which would provide answers to many of the questions that faced them regarding erosion management.

Coastal residents participating in the project completed individual input sheets and returned them to the district Extension office, where the analyses were run. They each received a personalized printout accompanied by information which helped in understanding the analysis. The analysis showed which generic approaches to erosion management were most appropriate and what the likely costs would be on an annual basis.

*Opposite: Destructive erosion caused by abnormal water levels on Lake Huron created this stairwell to nowhere near Port Huron, Michigan. District Extension Sea Grant agents are acting to provide accurate information to coastal residents who constantly face unpredictable weather patterns. Above: The waters of Lake Michigan rose to undercut a stable bluff and home near St. Joseph, Michigan. Ten homes in this area were either destroyed or removed.*



*Fierce Lake Michigan wave action undermined these sand dunes and beaches at South Muskegon, Michigan. To help break up the wave action, boulders have been placed at several locations.*

*Photographs on pages 14, 15, and 16 courtesy of the Soil Conservation Service.*

### Workshops Provided

The computer analyses represented a first step toward answering the questions of shoreline residents. To provide a more indepth understanding of coastal erosion, the computer analysis results, and the various options which might be selected, a series of workshops was offered to those who had received printouts.

Portable computers available at the workshops enabled participants to see how variations in input resulted in different erosion management options. Brief reviews of the processes of erosion and the various general methods available for erosion management were provided as well.

Finally, each participant received a printout of the composite "average" respondent, showing how each property varies and that none can safely be termed typical without making significant assumptions.

Participation in the workshops was less than had been anticipated, with slightly less than 14 percent of those participating in the computer analysis phase of the project also taking part in one of the workshops.

A follow-up survey of those not participating showed, however, that nearly 25 percent did not participate because the analysis printout had answered their questions adequately by itself, while more than 46 percent did not feel they faced significant erosion problems. It is not clear whether or not this last perception was based on the fact that ownership would be transferred before the eventual loss of their home.



### Future Efforts

The problem of coastal erosion has not gone away since last summer. In fact, the water levels of the Great Lakes have rarely been higher than those predicted for 1986, which means severe erosion for many property owners and communities.

The 1985 summer project was just a beginning. In 1986, a follow-up survey of 1985 participants will be completed to examine how decisions were influenced by these efforts. In addition, more than twice the number of coastal residents participating in the 1985 project will be involved in a similar effort in other areas of the state.

The potential economic benefit of these efforts is enormous; the very lives of some coastal communities may be at stake. It is crucial that Extension continues to act as an educational resource for coastal residents so they may better understand and deal with the continuing challenges that confront them as they inhabit earth's most dynamic environment. □



*Top Left: This seawall and shoreline protection scheme shields the shores along southern Lake Huron. Above: Timber seawall created to preserve a bay in northern Lake Michigan. Timber is cheaper than concrete but has a shorter functional life in the coastal environment. Below: A District Extension Sea Grant agent works with a student aide to input data on the computer as part of the 1985 Erosion Management Project. Every Great Lakes shoreline resident who participated in the Project received a printout analysis.*

# Terraces—Key To Kansas Soil Conservation

## 18 Extension Review

William S. Sullins  
Extension  
Communications  
Specialist  
Kansas State  
University, Manhattan



G. Morgan Powell (left),  
Extension agricultural  
engineer, and NACD liaison  
at the Conservation Tillage  
Information Center, checks  
the effectiveness of terrace  
maintenance practices at a  
Kansas farm. Terraces that  
are well maintained reduce  
the risk of erosion damage.

To keep topsoil from ending up in ditches, streams, and reservoirs, agricultural producers have relied on terraces since the disastrous consequences of erosion a half century ago. Grass waterways, underground outlets, and similar structures assure an orderly outlet for runoff collected in terraces.

If laid end to end, the terraces built in Kansas alone would extend about 360,000 miles, equal to the distance from the earth to the moon and half-way back. The acreage of grass waterways in Kansas equal an area one-third the size of Rhode

Island. Estimates for replacing these Kansas soil/water structures at today's prices approach \$1 billion; the cost to replace all of the nation's conservation structures might be incalculable.

"Maintenance of conservation structures is the crying need of the day on America's farms," says G. Morgan Powell, Extension agricultural engineer, and NACD liaison at the Conservation Tillage Information Center, Fort Wayne, Indiana. "Much like an old abandoned barn, conservation structures deteriorate and lose their effectiveness."

"Our conservation structures on agricultural land not only reduce erosion," Powell points out, "but also save moisture, often a production limiting factor."

Without terraces and outlets, farm production on erosion-susceptible sloping land, Powell says, would have a destructive effect on the soil resource. "After a time," he says, "the supply of food in this country would not be so abundant or so reasonably priced."

Terrace systems do need attention and maintenance to protect the investment in them.

Well-maintained terraces reduce risk from erosion damage resulting from overflow. They also encourage contour farming which saves power and water and reduces erosion.

### Joint Effort

For the past 9 years, Extension at Kansas State University, in cooperation with the Soil Conservation Service (SCS), local conservation districts, and Kansas land improvement contractors, have worked to teach landowners soil and water conservation principles. This instruction includes structure maintenance and repair of terraces.

The strategy, initiated in 1978, involves terrace maintenance demonstrations on farmer-owned land in cooperation with Extension county agents, USDA personnel, and others. Robert A. Bohannon, currently national program leader for soils, ES-USDA, served as Extension soil and water conservation specialist at Kansas State University, and joined Powell to add the grass waterway management component to the on-farm demonstrations.

"Those producers who recognized that a farm without good topsoil was much less productive," Powell comments, "were glad to see us because they knew this situation was unprofitable and made their land less valuable."

### Farmers Motivated

Most farmers believe terrace and waterway repairs are the type of farmwork that is easily put off.

"The demonstrations changed attitudes," Powell says.

"Farmers seemed to welcome the motivation they received. They were shown the benefits of good system management and related practices, including conservation tillage."

Conservation tillage has been viewed as the most cost-effective erosion control practice used by farmers, especially for sheet erosion. However, on sloping land structures are also essential to control concentrated water flows that cause rill and gully erosion. Conservation tillage, while a key to effective erosion control, simply is not adequate on slopes without structures.

Where no tillage is used, Powell reminds farmers, those erosion depressions from concentrated flow remain year after year.

Terraces and other structures for controlling rills and gullies are essential to a complete conservation system.

"We have demonstrated that terraces and accompanying outlets are our most effective method of controlling concentrated flow erosion," says Powell. "In dry areas, level ter-

aces provide an extra benefit of improved water management which boosts crop yields."

Conservation structures once consisted of contour terraces that curved with each undulation in topography. Farmers gradually switched to parallel terraces for improved "farmability." Today, radically different systems that run parallel to boundaries or other physical land features are gaining in popularity. These newer systems substantially improve farming with large equipment.

Where old terraces do not accommodate large equipment and higher field speeds, emphasis on maintenance is not justified. Powell tells farmers that "outdated systems are simply unacceptable today."

At the demonstrations, landowners learn they are doing a good job of maintenance when a system's capacity can carry a "once-in-10-years storm." Maintenance is usually adequate for gradient terraces when the ridge height above the channel is at least a foot.

For level terraces that must hold all runoff Powell suggests two feet.

### Many Maintenance Methods

The moldboard plow is still the most common maintenance tool



used by Kansas farmers. However, many tools can be used, including: the one-way front dozer blade, the three-point blade, the wheeled blade, the whirlwind terracer and belt terracer, scraper, motor patrol, and grader.

Powell sees a pressing need for staff of conservation districts, Extension, SCS, and ASCS to work together to maintain public interest in conservation structures as an integral part of a complete conservation system. "We owe it to our present cooperators and to the next generation," Powell says, "to hold the soil in place—without it the value of land is not much to talk about." □

*Left: Powell and local Kansas farmers observe terrace maintenance operations. Terraces are vital to maintain precious topsoil, conserve moisture, and maintain land values. Above: Plow employs three-point blade for terrace maintenance.*



# Focus On Alabama Forestry

20 *Extension Review*



**Vicky Potter**  
*Extension Technical  
Writer  
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With 21.7 million acres of commercial forestland—65 percent of Alabama's 33 million acres—it's natural that forestry should be that state's largest manufacturing industry. Forestry and related industries contribute more than \$2 billion to Alabama's economy each year. In addition, 74 percent of the state's forestland is owned by more than 200,000 nonindustrial, private landowners.

"Many people don't realize how important timber is to Alabama's economy," says Bill McKee, Extension forest economist at Auburn University. He points out that, according to figures compiled in 1982, about 50,000 Alabamians work in the timber industry with 14 percent of all manufacturing employment in the state—or one job out of every seven—in wood-based plants. The pulp and

paper sector of the timber industry employed almost half of the total timber workers, with approximately \$841 million in annual payrolls stemming from timber-based economic activities.

"Alabama's forests are currently growing slightly more timber than is being cut. However, more than one-half of the acres harvested annually aren't being regenerated, and natural stands are only producing fiber at one-third to one-half of their potential," McKee explains.

"That's real cause for concern. Increasing the productivity of the state's forests and encouraging landowners to regenerate timber stands is important if the state is to continue to have a healthy, growing timber industry," says McKee.

"It is natural that Extension focuses a lot of its attention on helping these private landowners."

### Regenerating Forests

"Increasing the productivity of Alabama's forests is one of our main concerns right now," says Larkin Wade, head of Extension's natural resources division. Wade agrees with McKee that more than one-half of the acres harvested annually aren't being regenerated.

Extension, Wade points out, has a variety of publications, workshops, demonstrations, and other educational programs each year to encourage landowners to improve management of their timberland.

"In 1984, for example, with the help of other agencies, we encouraged 2,014 landowners to improve 162,422 acres of forestland. This will increase their income by about \$77 million over the next 35 years," Wade says. "Evaluation of Extension program efforts in this area show that landowners will receive about \$7 in benefits for every dollar spent."

The county Forestry Planning Committees have played an important role in reaching the state's landowners, according to Wade. These voluntary committees stem from cooperative efforts among federal, state, and county agencies and industry.

Reforestation efforts got a big boost in 1982 when Alabama River Woodlands, Inc., gave Extension a grant to hire a multi-county Extension forestry agent to serve in Clarke, Conecuh, Monroe, and Wilcox counties. This agent has focused on regeneration of lands owned by small, private, non-industrial woodland owners, says Wade.

### Christmas Tree Industry

He explains that Extension also had a major influence in starting the growing of Christmas trees in the state. "In 1975 there were only 12 Christmas tree growers in Alabama—today there are at least 300. The Christmas tree industry accounts for an income of \$5 million to \$7 million annually."

"Reforestation is currently a major emphasis of the county forestry planning committees. More than 18,000 acres were reforested through a 10-county pilot project in 1984-85. Because of the project's success, an additional 10 counties are being added this year," Wade says. □



# Conservation Tillage—How Linkages Increase Adoption

## 22 Extension Review

James Bauder  
Extension Soil Scientist  
Montana State  
University, Bozeman  
and  
Fred Swader  
National Program  
Leader, Water  
Resources  
Extension Service,  
USDA



January on a Nebraska farm:  
standing corn stalks catch and  
hold the moisture from snow.  
This conservation tillage  
system reduces soil and  
moisture loss. Extension has  
been active in developing  
educational materials about  
soil conservation measures  
while maintaining effective  
linkages with the Soil Con-  
servation Service and the  
Agricultural Stabilization and  
Conservation Service.

Conservation tillage has been widely recognized over the years, but its value has recently become clearly understood, and it is now becoming an accepted farming practice.

Many government agencies have been involved with soil conservation. The Cooperative Extension System (CES), responsible

for educational programs, has been active in developing educational materials to deliver soil conservation information to America's land users. The Agricultural Stabilization and Conservation Service (ASCS) has provided financial assistance. The Soil Conservation Service (SCS) has provided technical assistance and has assisted with public education. As we celebrate the 50-year anniversary of

the SCS, these agencies continue to play important roles in soil and water conservation.

A local government agency has also been working to promote soil and water conservation—the Soil and Water Conservation District. Over, 3,300 of these independent, farmer-landowner-run districts exist throughout the United States. These grass-roots efforts have effectively promoted "on-the-ground" conservation practices, including conservation tillage.

### Need For Effective Linkages

The complexity of conservation tillage has raised many questions about its application over the last 40 years. However, farmers experience and research results now clearly indicate that both the economics of farming and the conservation of soil and water encourage the use of conservation tillage in many situations.

Conservation tillage can often provide a cost-effective means of conserving soil and water. There has been a real need for coordinated efforts to inform the public about conservation tillage. But coordinated efforts require linkages. There were no effective linkages to provide such coordinated approaches.

However, leadership by the National Association of Conservation Districts (NACD) with cooperation from many agencies, including Extension Service, has changed this situation.

### Information Center Formed

The NACD and its member districts have responded to the need for making more information available about conservation tillage, and the need to focus specific attention on conservation tillage. In 1983, this resulted in the formation, by the NACD, of the Conservation Tillage Information Center (CTIC).

The CTIC collects, identifies, and disseminates information about conservation tillage and has proven to be an effective linkage among private organizations and federal agencies. That linkage has permeated the entire agricultural community. As a result, working relationships and information transfer among local conservation districts, county agents, and SCS field staff are much more effective now than they have been in the past. CTIC provided the linkage; the driving mechanism has been conservation tillage.

### Information Network

The CTIC, located in Fort Wayne, Indiana, represents a classic example of linkage between local, state, and federal organizations for the benefit of a single cause. Early in 1982, the NACD and a number of industry representatives met to consider organizing a network that would provide for rapid transmission of information about conservation tillage.

Following discussions among representatives of several federal agencies, an Executive Board was created to help develop a charter and to identify goals. Its primary purpose is to locate information, key resource specialists, and statistics relative to conservation tillage, and assist in the dissemination of that information. Such a Center can increase the effectiveness of involved agencies in providing information, education, and technical assistance.

Cooperative Extension and land-grant university personnel are often hesitant to become actively involved in programs and activities that appear to be strongly influenced by industry groups. Conservation tillage is a farm practice that transcends the boundaries of both agencies and private groups.

### Resource Directory

A primary objective of the CTIC was to identify key resource individuals with expertise in various areas relating to conservation tillage. Many Extension specialists and researchers within the various land grant universities possess expertise in specific areas relating to conservation tillage.

However, these individuals are not the primary deliverers of information. Many field staff and industry personnel have frequent opportunities to provide up-to-date information to farmers. But such field staff seldom had direct access to Extension specialists or land grant university researchers.

The CTIC's task was to identify such resource people and integrate them into the network of information delivery. To do so, the CTIC created a directory of conservation tillage specialists, from within the ranks of USDA, Cooperative Extension, Agricultural Experiment Stations, private industry, and other agencies, including the EPA. The resource directory helps expand the efforts of such individuals.

The CTIC also developed a library of abstracts of publications about conservation tillage. The library presently contains abstracts of more than 700 publications.

As the Cooperative Extension System continues to perform its role of information development and delivery, such linkages will play an increasingly valuable role in providing assistance. The CTIC facilitates information transfer between agencies and industry, demonstrating the benefits of such linkages. □

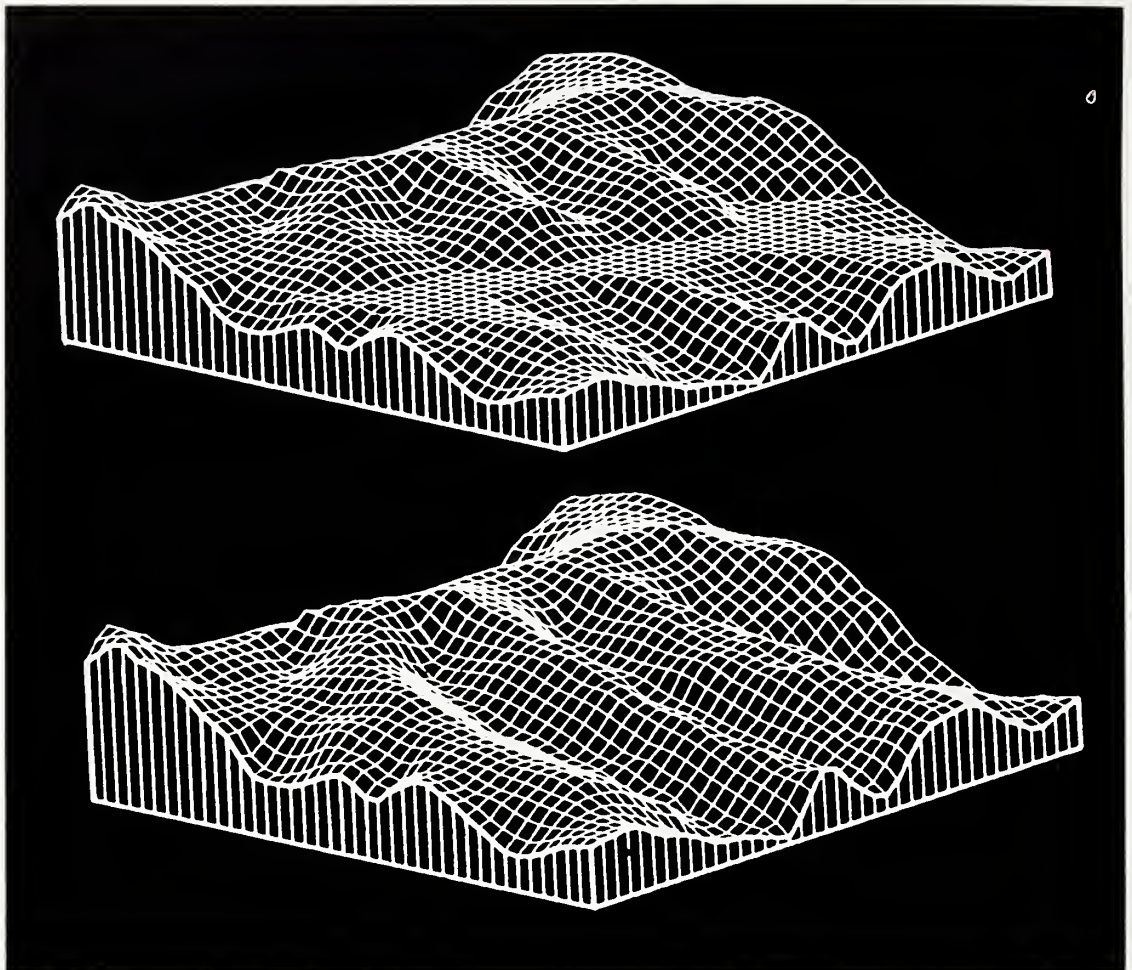
# Moving Mountains In Coal Country

24 Extension Review

Sherrie R. Whaley  
Extension Information  
Officer  
Virginia Tech,  
Blacksburg

Top: An isometric representation of pre-mining (below) and post-mining (above) topography on southwestern Virginia's Amos Ridge. The aim of an experimental plan now being tested in this area is to backfill and revegetate all highwalls, and construct nearly level areas where mining has left steep slopes.

Below: Reconstruction of surface mined sites is not always successful. On this backfill in southwest Virginia vegetation has receded from the reconstructed areas.



Lee Daniels and his research colleagues are literally moving the mountains of southwest Virginia. Daniels, a Virginia Tech agronomy instructor, is helping to perfect a technique that could ultimately change the face of Appalachia's coal-producing regions.

Since 1977, federal law has required surface mine operators to restore the land to approximate original contour (commonly referred to as "AOC") after mining operations are completed. AOC requires mine operators to backfill or place the rock spoil generated in mining up against the exposed face of the rock known as the highwall. "In regions where steep slopes abound, such as southwest Virginia," Daniels points out, "the practice may lead to increased erosion and decreased land-use value."



Research in Appalachia's hard-rock regions was meager until Daniels began studying AOC backfills and their problems in 1983. "With detailed on-site work," Daniels says, "we hoped to find out why the failures occurred and if these backfills would be stable over the long haul."

Through Virginia Tech's Extension and research arms, dozens of innovative research activities have focused on mining and reclamation technology, post-mining use of reclaimed land, water quality and supply, and environmental and economic factors.



### Research Project

In 1980, a partnership between Extension, research, and education resulted in the Powell River Project, a comprehensive technology transfer project initiated at Virginia Tech. The Project, headquartered in Wise County, is aimed at improving the future well-being of Virginia's seven coal-producing counties.

"The project has been called one of the most ideal land-grant programs because of its three-way partnership," says H. John Gerken Jr., Extension specialist and project coordinator. The coal industry, federal and state agencies, and local citizens also are heavily involved in the project, contributing more than \$1 million and the use of more than 10,000 acres.

### Examining Sites

With Powell River Project support, Daniels, Research Associate Jay Bell, and doctoral student Carl Zipper, have spent the past 3 years studying AOC problems in the coalfields. "We surveyed over 30 sites, both failing and non-failing, to learn what the major weaknesses in the AOC technique were," Daniels explains.

They discovered three characteristic weaknesses. The fills were often too steep, or weakened by water seepage, or incorrectly constructed by the placement of spoil material beyond the front edge of "the

bench"—a flat area left after the coal has been removed. "No one had put these things up before, so a lot of variability was to be expected," Daniels says.

The intent of the federal provision was good, Daniels stressed. Tremendous environmental degradation had resulted from surface mining, much of it due to improper mining techniques.

"The mining industry really had no economic motivation to do a better job until the 1977 law was enacted. With it came some fairly strict economic and environmental standards," Daniels explains.

As a result of the law, coal operators are required to post bond before beginning work on a mining site. After the mining operation is completed, the site must remain stable and well-vegetated for 5 years before the bond is released. If failures occur within the bond period, the company must return to the site and repair the fill.

### Ensuring Stable Fills

"We're compiling guidelines for coal operators that, if used uniformly, would ensure stable fills," Daniels comments.

The Virginia Tech researchers also verified a computer modeling technique that can predict where failures might occur. "We're real happy with the program" says Daniels. "With the correct data, operators or engineers should be able to use these models effectively."

In addition to searching for the best way to construct AOC backfields in various topography, the researchers are also looking for alternatives to the current method. "We want to keep the fills stable and cover up most of the vertical high-wall. The object is to reach approximate original contours," he notes.

Constructing AOC backfields on certain steep slopes is practically impossible. Native slopes in southwest Virginia commonly range from 25 to 33 degrees. Restoring mined land to original contour under these conditions is difficult for the miner and can have severe environmental consequences if landslides occur.

### New Mining Practice

One promising alternative is a mining plan currently being tested on Wise County's Amos Ridge. There, Daniels is working with Andy Hall, a contract miner and owner/operator of Amos Ridge Coal Company, on an experimental practice—the only one of its kind in the country.

Under a variance from the Office of Surface Mining, Hall is taking the rock spoil down into the mountain hollows, backfilling and revegetating all high-walls, and constructing nearly level areas where steep slopes stood before mining.

"In addition to meeting environmental performance standards, we are drastically increasing the land-use potential in a region where flat land is at a premium," notes Daniels. "The fills are also being constructed with gentler outcrops so that failure is virtually impossible—a comforting thought to operators."

If adopted, these alternatives could ultimately make surface mining a safer, cheaper, and more environmentally sound method of coal removal, Daniels believes. □

*Left: Lee Daniels, Virginia Tech agronomy instructor, discusses AOC ("approximate original contour") failures with a visitor on Powell River Project Field Day. The Project, located in Wise County, Virginia, is focused on improving post-mining operations in the state's seven coal-producing counties.*

# Michigan Protects Against NPS

## 26 Extension Review

**Peggy Kemp**  
*Associate Editor, ANR  
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With help from Michigan State University's Cooperative Extension Service, Michigan, the state that's surrounded by the greatest concentration of fresh water in the world is taking steps to protect its water from nonpoint source pollution (NPS).

NPS is often invisible, frequently ignored, and can have a devastating effect on groundwater quality. Unlike other, more readily identifiable forms of pollution, NPS is conveyed to surface and groundwater through natural processes, such as storm runoff or groundwater seepage. It can be controlled through changes in land management practices.

### Agencies Alert Citizens

Under Extension's lead, the importance of making such changes are coming to the attention of Michigan's citizens—urban and rural—through the efforts of a number of agencies.

Among them are the Michigan Departments of Agriculture, Natural Resources and Public Health, the USDA Agricultural Stabilization and Conservation Service, the USDA Soil Conservation Service, and the Agricultural Experiment Station of Michigan State University.

Working together, these agencies developed a plan to curb nonpoint source pollution. At the forefront of this effort is Michigan's Extension Service.

"Extension is a natural network to convey educational information and materials to the public on this issue," says Adger Carroll, assistant director of Extension for natural resources and public policy.

### Educational Efforts

"Maintaining and improving the quality of Michigan's abundant water resources can best be accomplished through educational efforts aimed at prevention of NPS pollution," Carroll says.

To this end, Extension has mobilized the research and educational resources of Michigan State to produce a wide variety of educational materials. Extension specialists and agents produced a new series of Extension bulletins on topics related to animal wastes, crop and soil management, and non-agricultural uses.

Through print and broadcast media, citizens are learning what nonpoint source pollution is and what they can do to prevent it.

Extension agents in Michigan's 83 counties have been able to take advantage of special training offered at campus-based in-service sessions and seminars held throughout the state.

Through this new series of bulletins, workshops, and the outreach efforts of specially trained agents, Extension is reaching those who are affected by the problem of NPS as well as those who can remedy it.

### Targeting Information

Specific information is targeted to the needs of cash-crop farmers and feedlot managers, backyard gardeners, fruit and vegetable growers, septic tank users, lake-front property owners, and public officials.

"Treatments used to deal with the highly visible, readily identified sources of pollution are not effective on nonpoint sources," Carroll says. "Nonpoint source pollution does respond to improved land use and management though, and these changes can be accomplished through education.

In the area of crop and soil management, educational efforts are aimed at preventing soil erosion and runoff that carries nutrients—principally nitrogen and phosphorus—and organic compounds—such as those found in pesticides—from crop land to water supplies. Much of this can be prevented through reduced tillage methods, proper pesticide disposal, and efficient irrigation.

Animal wastes generated from feedlots and large livestock operations can be at the root of both runoff and leaching problems of surface and groundwater. Animal waste pollution causes eutrophication of inland lakes, as well as leaching high concentrations of nitrate nitrogen into underground water.

About 15 percent of Michigan's toxic waste comes from homes and small businesses. Primary sources of nonpoint source pollution are construction sites, lawn and garden chemicals, stormwater runoff, underground storage tanks, improper waste handling and disposal, and misuse of household chemicals and petroleum products.

Michigan Extension has taken the lead in providing educational resources to meet the diverse problems of unique audiences. Through one-to-one contacts, bulletins, media stories, workshops, and consultation, Michigan's citizens are learning more about a critical problem—and how to deal with it. □



*Cooperative Extension Service  
Programs for Improved  
Water Quality in Michigan*

# 4-H And Wildlife— A Tennessee Recipe

Extension Review 27

*RECIPE: 1 young inquisitive mind  
1 or more wildlife information sources  
and motivation and leadership*

Throw in a dash of leadership training, mix thoroughly, then age for a few years. Result? A citizen who is knowledgeable and, most likely, concerned about our wildlife resources.

Early in the history of 4-H, Extension recognized that wildlife should be one of the project areas taught to youth. Back in 1930, Indiana was among the first to include wildlife as a project area. In 1972, the 4-H Wildlife Project began in Tennessee.

Sponsored and encouraged by the Tennessee Wildlife Resources Agency, the project now has 30,867 members, the largest state enrollment of any similar project in the Nation. In 1976, the then 24,000 plus members were recognized with the Youth Conservationist-Of-The-Year Award for their contribution to wildlife.

Tennessee's Wildlife Project includes a core project and three main satellite activities—the State 4-H Wildlife Conference, the State 4-H Wildlife Judging Contest, and the State 4-H FACE for Wildlife Contest.

## Core Project

At age 10, 4-H'ers begin to read Extension wildlife literature designed to introduce them to the many areas of wildlife study.

Once the 4-H'er picks a topic of interest, he or she studies it for a year, using literature furnished by Tennessee Extension, as well as other agencies. An activity is usually carried out and records are kept.

The 4-H'er then prepares a demonstration to show and tell others what he or she learned that year. These demonstrations and project records are judged at the county, district, and state levels.

## 4-H Wildlife Conference

The top two junior high winners in each county receive scholarships to the annual State 4-H Wildlife Conference. During the past 13 years, over 2,500 young people have trained at this week-long leadership conference. Instructors are professional wildlife biologists who represent several agencies.

The conference includes formal classes in game management, fish management, reptiles, amphibians, wildlife ecology, taxidermy, predation, hunting safety, and wildlife management methods.

Participants take a comprehensive exam at the end of the week on the material covered; scores average in the low 70's each year. These scores usually reflect an over 50-percent increase in knowledge from scores of a pre-test given before the conference.

## 4-H FACE For Wildlife Contest

Contests have long been a tradition in 4-H. Competition, awards, and recognition help provide incentives for what otherwise would be hard work and study. With this philosophy in mind Extension began the Tennessee 4-H FACE for Wildlife Contest. FACE stands for *food and cover establishment*.

To begin the contest, the Tennessee Wildlife Resources Agency provides each participant a free bag of seed. The 4-H'er plants the seed in one wildlife plot and keeps accurate records. All plots and records are then judged by the county 4-H Extension agent and the county wildlife officer. Winning county plots are judged at the regional and state levels. Winners at all levels receive awards—up to the top state award of \$300 plus a trophy.

The Tennessee contest has grown to include approximately 1,000 4-H'ers each year.

## 4-H Wildlife Judging Contest

The 4-H Wildlife Judging Contest originated in Tennessee in

1977. The contest involves training 4-H'ers to evaluate fish and wildlife habitat, determine how well it suits the needs of fish and wildlife, and recommend ways it can be improved for various species of fish and wildlife.

Awards presented are plaques, medals, and T-shirts printed with the words "4-H Wildlife Judging." The state winning team receives an out-of-state wildlife educational trip.

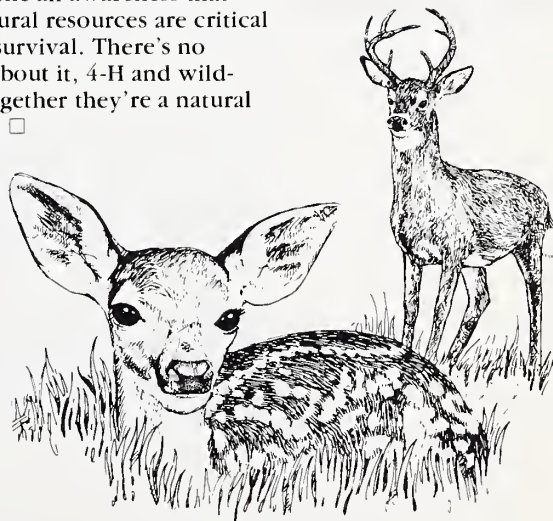
In 1985, a \$13,500 grant from the U.S. Fish and Wildlife Service sponsored a regional workshop. Specialists from all the southern states were introduced to the concept of fish and wildlife habitat judging. Since the workshop, every state has indicated plans to conduct this activity. A regional contest is planned for 1987.

## Program's Success

A few years ago, as a member of the National 4-H Natural Resources Committee, the author surveyed alumni of 4-H natural resource projects nationwide to evaluate the success of the educational program. Of those responding to the survey, 58 percent indicated that gaining an awareness, appreciation, and understanding of natural resources was a main benefit of their 4-H training.

Teaching 4-H'ers is one of the best ways to instill in the American public an awareness that our natural resources are critical to our survival. There's no doubt about it, 4-H and wildlife—together they're a natural recipe. □

**James L. Byford**  
Professor and Acting  
Department Head  
Extension Wildlife  
Specialist  
Department of  
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# Reclaiming A Wasteland For Crops

28 *Extension Review*



**Charles T. Woods**  
*Extension Associate  
Editor  
Institute of Food and  
Agricultural Sciences  
University of Florida,  
Gainesville*

"When the phosphate industry begins to wind down in Polk County by the end of the century—ending more than 100 years of mining in the 'Bone Valley'—the annual economic loss in the county will top \$1 billion!

"Gone will be some 12,000 jobs, millions in tax revenues and the economic spinoff of a once-thriving industry. About the only thing left will be some 200,000 acres of scarred land that former Governor Askew called a moonscape!

"That's a worst-case scenario for the southwest part of the county if we did nothing to reclaim or rejuvenate these mined lands, which is basically what we've done in the past," says Polk County Commissioner Ernie Caldwell, who wants to turn mined "wastelands" into productive farming areas.

"We're talking about filling a big void in our local economy," Caldwell explains. "Prior to mining, the land has an assessed value of \$5,000 per acre. After mining, it has a tax value of \$100 per acre.

That's a tremendous loss in value, not to mention employment and other business activity generated by the phosphate industry."

"Of course, it won't happen overnight, but ore will be depleted within 15 years and the industry will move on into Hardee, DeSoto, and Manatee counties," he says. "If we can shift citrus and other agricultural operations to reclaimed phosphate land in southwest Polk County, we can create new jobs and a tax base."

Caldwell points out that if 100,000 acres of mined land is eventually used for producing high-value crops, an estimated 14,000 new jobs will be supported and tax revenues will increase from \$1.20 per acre to about \$40 per acre or a gain of \$3,880,000 per year.

## **Demonstration Project**

To demonstrate that citrus and other crops can be grown commercially on these unstable soils, Caldwell proposed a large-scale research project at a 1983 Extension Advisory Council Meeting. Three years later, funding has been received to begin the Polk County Mined Lands. Agricultural

Research/Demonstration Project, a cooperative effort involving the Polk County Board of Commissioners, the Florida Institute of Phosphate Research (FIPR), and the University of Florida's Institute of Food and Agricultural Sciences (IFAS).

First year of the project is being supported by a \$750,000 grant from FIPR, a state agency whose funds come from a severance tax on phosphate ore. Additional funds and other support from Polk County and IFAS will bring the first year total to \$1.5 million. The project will be conducted on 229 acres of mined land being leased from Agricor Mining Company, Mulberry, and International Minerals and Chemical Corporation in Bartow, Florida.

### To Share Results

Research results will benefit not only Polk County, but also will be shared with adjoining counties having mined lands. Total phosphate mining acreage in Florida is about 500,000 acres.

Caldwell believes some of the mined lands will be valuable industrial sites because transportation and other infrastructure are already in place. Others will be developed because they are in the path of urban growth.

But, the vast majority of mined land cannot be developed because of remote locations or structurally unstable soils, particularly the phosphatic clays.

Until now, he points out, the phosphatic clays or clay settling areas (also known as "slimes") which cover 60 percent of the mined areas, have been "virtually useless."

### A Pioneer Effort

James A. Stricker, IFAS Polk County Extension director and director of the project, says this research/demonstration effort is unlike anything ever attempted in the past. A 1-year startup and 10-year research program is proposed.

"We need to develop a whole new data base or set of cultural practices for this type of soil," Stricker explains. "This, in turn, will attract the private investment needed to produce crops on reclaimed land."

The agronomic advantages of phosphatic clay soils outweigh the disadvantages, he says. The research program initially will concentrate on vegetable crops and grain crops. Work with ornamental crops and turf is expected to begin the third year of the period. Citrus also will be a potential crop for reclaimed lands.



### Extension Know-How Required

The project will require the expertise of many IFAS research and Extension faculty. Vegetable crops specialists will study such things as cropping sequences, planting techniques, pest control, and harvesting. Agricultural engineers will look at drainage, tillage methods, and machinery modification.

Soil scientists will work on soil modification to improve fertility and trafficability. Agricultural economists will measure market timing and other economic factors associated with production of reclaimed land.

Stricker says that some of the vegetable crops that might be grown include sweet corn, snap beans, southern peas, broccoli, cauliflower, pepper, and leafy greens. Possible grain crops are field corn, grain sorghum, rice, wheat, and soybeans.

### Industry Helping

The phosphate industry has been an active participant in the project, according to John Tallant, former land manager with Estech, Inc., a Bartow-based phosphate mining company.

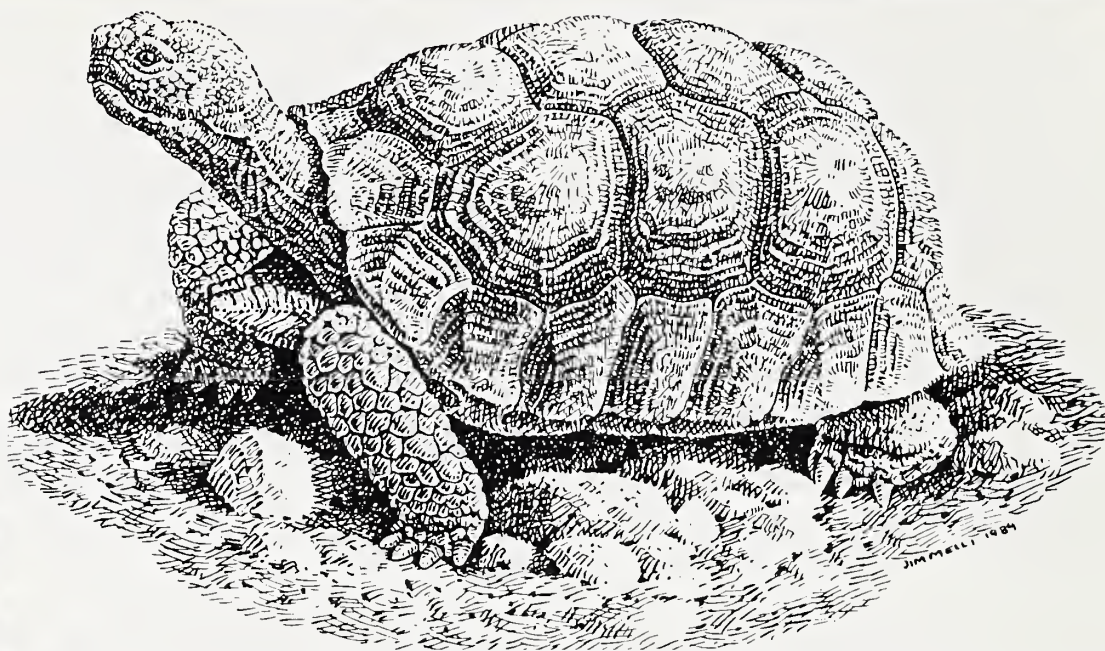
"For the better part of a decade, a number of us felt like the proverbial voice in the wilderness in promoting the use of these lands after mining. It has been very gratifying to participate in the planning for this project because it offers a potential far beyond what any one company could undertake," Tallant says. "If you consider the large-scale displacement of agriculture that is occurring as a result of urbanization in Florida, it makes a lot of sense to use these lands instead of going to more marginal natural sites." □

*Opposite: Aerial view of a typical phosphate mining operation in Polk County, Florida. A demonstration project is underway to turn mined "wastelands" like this into productive farming areas. At right: Polk County Commissioner Ernie Caldwell (left) and Extension Director Jim Stricker, director of the research/demonstration project, inspect a mined site. Behind them is a low ground pressure vehicle used to reclaim clay settling areas.*

# 4-H Sticks Its Neck Out

## 30 Extension Review

Robert Norris  
Area Extension  
Specialist, 4-H  
and  
David Torell  
Area Extension  
Specialist, Livestock  
and  
Amanda Penn  
Dunkerly  
Extension  
Communications  
Coordinator  
University of Nevada,  
Reno



Did you know you should never tether a tortoise? Many 5th and 6th graders in Las Vegas, Nevada, know it, thanks to a new 4-H environmental education program.

The Desert Tortoise Program in Southern Nevada teaches youngsters about the tortoise's environment and life cycle, but, most importantly, the program stresses how fragile this Mojave Desert creature is.

### Hazardous Habitat

The Mojave Desert ranges across southern parts of Nevada, California, and Utah, plus northern Arizona. The plants and creatures that live there have remained unchanged for thousands of years. The environment allows the natural balance of plant and animal life. Within that desert habitat, the wildflowers, bushes, and sandy soil provide the tortoise with the food, moisture, and shelter it needs to survive.

Because of its peculiar life cycle, the odds of survival are not in the tortoise's favor. Tortoises take a long time to reach adulthood. A young tortoise's shell does not harden until it is about 4 years old, making it easily ingested by predators.

Wild tortoise females do not lay eggs until they are about 20 years old, which is part of the reason why tortoises could become extinct so easily. And, while one female may lay up to 14 eggs in the spring, only about 1 to 5 percent of the hatchlings will survive to adulthood.

The reduction in the natural desert environment also affects the survival rate of the desert tortoise. Man's impact on the desert ecosystem can influence the chances of a tortoise having sufficient forage and shelter to survive.

### Concerned Agencies

The Mojave Desert Range Project is composed of a group of Extension specialists from the four-state area concerned with resolving multiple-use conflicts of Mojave Desert range land.

Within the scope of the Project is a subcommittee devoted especially to the Mojave Desert Tortoise. Committee members include representatives from the Bureau of Land Management, the Fish and Wildlife Service, and the TORT Group (an organ-

ization for the protection of Nevada's resident tortoises).

Initially the subcommittee gathered input from ranchers and environmental and special interest groups to assess concerns on the welfare of the tortoise.

"The subcommittee found that a major threat to the tortoise's survival is predation by man," says Dave Torell, Southern Nevada Extension livestock specialist and president of the Mojave Desert Range Project. "The first step we decided to take was to educate the public on just how fragile the tortoise and its environment are. The committee felt that the best place to start was with the youth," he adds.

Torell presented the committee's ideas to Bob Norris, Southern Nevada area Extension specialist, 4-H. "Initially, we met with the school district's curriculum specialist to determine at what educational level a Desert Tortoise Program would be most relevant," explains Norris. "From that point we

developed the program around information garnered from the University of Nevada's College of Agriculture, the Bureau of Land Management, the Department of Wildlife, and the TORT Group."

### Implementing The Program

Susie Askew, Extension associate, 4-H, began a campaign to market the Desert Tortoise Program to Clark County elementary school teachers. Askew sent fliers to elementary schools announcing the program. "Because most teachers thought the program was relevant to and needed for their curriculum enhancement, Desert Tortoise quickly became a popular program for 5th and 6th graders," says Askew. "Since the program's beginning 3 months ago, we have taught over 400 students," she adds.

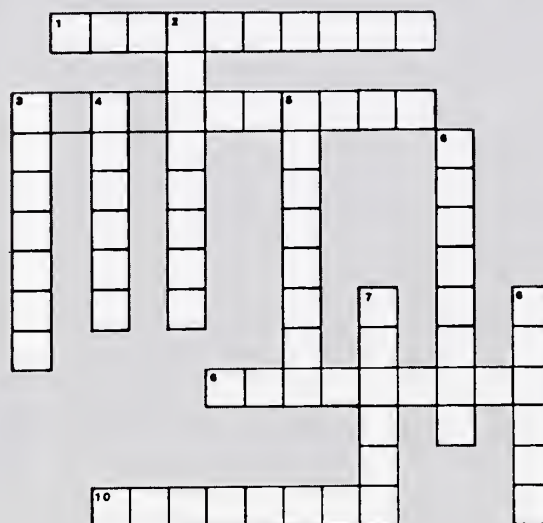
The program includes a color slide presentation, developed by the Desert Tortoise Preservation Committee. The script, adapted for the 5th and 6th grade educational level by Norris and Torell, tells about a day in the life of a desert tortoise. The slide program explains the reproductive cycle of the tortoise, plus how the tortoise manages to survive in its harsh environment.

After the slides, each student completes a crossword puzzle, called "Tortoise Trivia," to reinforce the knowledge gained during the program. Participants also receive a take-home handout on the desert tortoise to share with their parents.

"It's great to see excited youngsters learning about their environment in relation to the desert tortoise," says Norris. "Through the Desert Tortoise Program, the kids have gained a new respect for the frailty of the desert and its inhabitants." □



### TORTOISE TRIVIA



#### ACROSS

- 1) Baby tortoises.
- 3) Period of inactivity from October to February.
- 9) Animals that eat tortoises.
- 10) The family of snakes and tortoises.

#### DOWN

- 2) Top tortoise shell.
- 3) Tortoise Environment.
- 4) Underground den.
- 5) Land turtle.
- 6) Bottom tortoise shell.
- 7) Source of water for tortoises.
- 8) Mohave \_\_\_\_\_.



Top: Two 4-H's, 6th graders in Las Vegas Nevada, meet the desert tortoise as part of an environmental education program based on this fragile creature of the Mojave Desert. Left: A "Tortoise Trivia" crossword puzzle reinforces student knowledge about the new 4-H program. Right: Predation by man is the greatest threat to the survival of the desert tortoise.

# Exploring The World Of Water

32 Extension Review

Barry W. Fox  
Extension Specialist  
4-H Marine Education  
Virginia State  
University, Petersburg

Top: 4-H'ers participating in Virginia's 4-H Marine Program pull in a seine to discover the sea creatures they will study. This scene took place at the Senior 4-H Marine Leadership Camp at Virginia Beach where youth gain leadership skills and knowledge of the marine environment. Below: 4-H youth gain hands-on experience as they explore the ocean's resources.



The seine is pulled out of the water by a group of excited 4-H youth who enthusiastically pick up a myriad of wiggling fish, shrimp, and other marine organisms. There are squeals of delight and surprise as the youth place them in buckets for observation.

Further down the beach other 4-H'ers perform water chemistry tests, study plankton samples with microscopes, or measure wave and current motion; all under the watchful eyes of their adult volunteer leaders and 4-H agent.

These 4-H youth are gaining hands-on experience in observing the environment and exploring the fascinating world of water by participating in Virginia's 4-H Marine Program.

## Started With Grant

The Virginia Sea Grant Program provided a grant to begin the Program in 1981. Richard Booker, Extension specialist, 4-H Youth, saw the need for an effective marine education program for Virginia 4-H and submitted the grant proposal. Barry Fox, Extension specialist, 4-H marine education, began the job of developing strategies and implementing marine education into Virginia's 4-H curriculum.



The major objectives of the Program are to increase awareness and appreciation of youth and adults for the environment, provide leader training, and develop educational resources.

The Program, now supported by the 1890 Extension Program at Virginia State University, uses three modes of delivery to accomplish these objectives: school and community 4-H clubs, summer camp and special field programs, and adult volunteer leader and 4-H agent training and participation.

## Studying The Environment

Warm weather months mean numerous field trips to beaches, lakes, and streams for Fox, 4-H'ers, and assisting agents and leaders. In addition to coastal marine habitats, inland freshwater environments are studied.

Field studies are not the only activity of the 4-H Marine Program. Historical, economic, and management issues concerning marine and freshwater resources are integrated into the Program.

To better explore these topics and help plan activities and events, the 4-H Marine Program receives assistance from The Mariners' Museum, Chesapeake Bay Foundation, Virginia Game Commission, Virginia Institute of Marine Science, Marine Advisory Service, and other organizations.

Since June 1981, approximately 5,000 youth have participated in more than 40 special marine and freshwater 4-H field programs in Virginia, ranging from 1 to 5 days in length. These programs involved more than 35 counties and approximately 140 adult leaders. In addition, marine and freshwater education classes were periodically taught at Virginia's six 4-H Educational Centers.

#### 4-H School Club Projects

The Program provides educational activities for Virginia's large 4-H school club membership through a series of 4-H marine projects for students grades 4-7. Four projects are available which explore physical properties of water, aquatic and marine ecology, ocean structures and tides, and marine resources.

Additional marine project publications are planned on topics including taxonomy, pollution, and marine related careers. Besides the project publications, information is offered on a wide variety of other activities ranging from aquarium management to taxidermy.

Through workshops and special presentations, Fox trains teachers, leaders, and agents in a number of marine and freshwater education topics. Educational resource development is always included to help participants build their own programs.

#### 4-H Marine Camp

In 1982, Fox and 4-H Agent Joseph Hoffenberger conducted a 4-H Marine Day Camp in Virginia Beach with assistance from VIMS Marine Advisory Personnel and the Citizens Program for the Chesapeake Bay. That camp program resulted in two major accomplishments—the formation of a 4-H Scuba Diving Club and a pilot for a statewide Senior 4-H Marine Leadership Camp.



The Virginia Beach 4-H Scuba Diving Club, led by Hoffenberger and Adult Leader Ann Retz, is the only such 4-H club on the East Coast. The club has assisted in a VIMS eel grass restoration project.

The Senior 4-H Marine Leadership Camp, started in 1984, provides senior 4-H Youth the opportunity to gain leadership skills and subject-matter knowledge in environmental education. The 1985 camp, attended by 76 youth and adults, included an overnight canoe trip, an estuarine river ecology program, and a special study program cosponsored by the Mariners' Museum and Chesapeake Bay Foundation.

The major objective of the Marine Camp is to train senior 4-H youth to be the environmental educators for junior 4-H camps and community

*Measuring water table depth can look more dangerous than it is. Since 1981, approximately 5,000 youth have taken part in more than 40 special marine and freshwater 4-H Virginia field programs.*



*4-H'ers and adult volunteer leader wade into the surf to study wave height. The 1890 Extension Program at Virginia State University supports this marine education.*

clubs across the state. Many camp participants have already started sharing their new knowledge and skills with other 4-H'ers.

Fox and Hoffenberger are developing plans to pilot a 4-H Marine Day Camp for the Disabled in Virginia Beach. The camp will provide field experiences designed to meet the special needs of disabled youth.

#### **County Programs**

Many counties in the state are developing their own marine and freshwater field day programs with assistance from the specialist. Fox is working to provide each district with their own field equipment and trained leaders.

#### **Environmental Awareness**

"We're not trying to make scientists of these youngsters," says Fox. "First we get them excited, catch their interest, help them overcome

any fears or apprehensions they may have of the natural world, then let them explore and discover.

"The experiences of seeing the natural world close up and discovering how organisms live and coexist will always be remembered," he adds.

"The 4-H Marine Program helps youth develop positive attitudes toward the environment so they will make responsible decisions as adults." □

# Our Working Environment

Extension Review 35

Good office planning involves all office personnel and gives careful attention to products, procedures, people relationships, environment, and equipment.

In today's complex communication age, poorly designed office or obsolete office facilities and procedures can influence the effectiveness of the Extension office in the community. An inefficient work environment results in disorganization and contributes to low employee morale, lack of job enthusiasm, and low productivity.

The reception area establishes the atmosphere for the entire office. A 42-inch reception counter provides private workspace for the receptionist while allowing interaction with the public. Design the area to screen plant specimens and soil samples from office visitors. Display Extension and USDA publications in the reception area where visitors can review and select timely publications without assistance. Seating for four to six guests is adequate for most offices.

## The Office Hub

The clerical workspace is the hub of a well-run office. The reception and clerical workspace may be combined in small offices. Movable 45- to 60-inch-high acoustical screens or file cabinets with attached acoustical panels reduce noise, provide visual privacy, and serve as a tack surface (bulletin board). Each employee, if possible, should have visual accessibility to a window for psychological and physical comfort.

As more Extension offices acquire microcomputers, space must be planned in either the clerical work area or in a small separate office. The keyboard, display screen, and printer support surfaces need to be approximately 24 to 30 inches deep. The minimum length of 5 to 6 feet can be either one continu-

ous surface or an "L" arrangement. A learning center can be included here for study of video cassettes, slide sets, audiotapes, self-study programs, and other resource materials.

## Central File Location

Filing systems vary. Central files containing information related to the entire office may be placed in the clerical work area or at a central filing location. Place subject matter files in one central location for more economical use of space. Personal files should be located in individual workspaces.

A well-designed workroom is critical to the efficient operation of the Extension office. A service entrance will facilitate in receiving deliveries, loading supplies, and moving equipment. Install one-way windows, a buzzer, or flashing light system to alert the employee to office visitors.

Design space to accommodate both existing and future workroom equipment. One of the best solutions is a built-in "L" or "U"-shaped counter, with or without a sink, that is 18 feet × 25 feet long, 24 inches deep and 36 inches high. For seated tasks, plan a 30-inch-high work surface. Store paper and other supplies in base and wall cabinets. Sliding base cabinet shelves make all supplies easily accessible.

## Publications Storage

Store publications in or near the workroom to allow for easy delivery, loading, and assembly of program materials. A metal open-shelf lateral filing system (frequently used in dental and medical care facilities) is the most efficient storage method.

Most agents need private offices to allow for counseling. These offices should be easily accessible from the reception area. Although needs vary, basic furnishings may include: a 30-inch × 60-inch desk; a 30-inch × 5-foot-long table, desk return, or credenza; a chair; 1 or 2 four-

drawer file cabinets, 15 to 20 lineal feet of book shelving; 2 guest chairs; and a small conference table. Minimum square footage required is 120 to 150 square feet.

A small conference room should be provided to accommodate 12 to 15 people sitting at a table for staff meetings or small training sessions. We recommend a wall-mounted dry erase board (chalkboard), a wall tack surface, and a ceiling mounted projection screen. Cabinet units can provide both storage and operating surfaces for audiovisual and other required equipment.

Most offices today recognize the need for an employee area. Ideally this is a separate room with table, chairs, small kitchen, and restroom facilities. This space should be separated from the small conference or community room.

## Materials And Color Values

Flooring materials in medium-range color values and heather textures provide a good background for furnishings and are the easiest to maintain. A wainscoting of paneling or commercial grade vinyl protects the lower wall in corridors and other heavy traffic areas.

If new furniture is purchased, consider color and design compatibility with existing pieces. Metal or wood chair arms will wear longer than upholstered arms.

Professionally designed exterior and interior signs that are easy to see and read support a professional image. When designing new or renovated office facilities, the above considerations will help in planning an efficient work environment that will contribute to your Extension program. □

*Ann Whiteside  
Associate Professor of  
Interior Design,  
Human Environment:  
Design & Textiles  
and  
Linda Reece  
Extension Home  
Furnishings Specialist  
University of Kentucky,  
Lexington*

# Water Watch

## 36 Extension Review

*Eleanor J. Walls  
Extension Housing  
Specialist  
University of  
Arkansas, Little Rock*

An important issue Arkansans face is the appropriate use and protection of the state's water. Through a statewide Extension program called Water Watch, Arkansans have increased their understanding of water issues and of the importance of water conservation.

Water is an abundant resource in Arkansas, but there is an uneven distribution and no legal vehicle to control redistribution or sale of either surface or groundwater.

A comprehensive water code was drafted by a Water Study Code Commission, appointed by the governor, but was defeated in the 1983 legislative session. During the 1985 session a second code was proposed but many Arkansas residents were unaware of the need for or the implications of the proposed legislation.

### **Two-pronged Effort**

Water Watch became a two-pronged effort to (1) help citizens become aware of all sides of the water control issue and (2) to encourage water conservation and management by Arkansas citizens.

These efforts were implemented through the Arkansas Extension Homemaker Council's Housing, Energy, and Environmental program and the Citizenship, International, and Community Outreach program of work for 1984-86.

In addition to providing a needed educational service, Water Watch provided a vehicle for Extension Homemakers to reach new audiences, to recruit new members, and to become more active in public affairs.

In the first prong of the program Extension planned and implemented countywide public forums where issues relating to proposed water policies and potential implications could be discussed. The Extension Homemakers were the organizers and the facilitators of these forums.

Speakers included such interested parties as Arkansas Farm Bureau members, members of the Arkansas Bar Association, legal aides from the Attorney General's Office, the Dean of the University of Arkansas School of Law, well drillers, members of the 1983 Water Study Code Commission, legislators, and farmers.

These forums allowed all viewpoints of this very emotional issue to be discussed, which enabled the voter to make a more informed decision.

### **Reduced Consumption**

The second prong of Water Watch encouraged individuals and families to discover ways to reduce water consumption without drastically altering their lifestyles.

Copies of the publication, "Water Conservation Checklist," purchased from USDA, were distributed. When the supply was depleted, the publication was reprinted in Arkansas. A coupon contained the Extension Homemakers Council (EHC) logo, space for the participant's name and address, and space for individuals to list five water use practice changes they planned to adopt. A sample of these participants will be drawn in the fall of 1986 to do a follow-up evaluation.

Over 11,000 copies of the checklist were distributed at the forums, fair exhibits, "Water Days" special interest meetings, booths at banks, malls, and local stores, and, in one county, at tables near polling places on election day.

Four-H members have also been involved to support the community outreach segments of their 4-H projects. A senior 4-H member won first place in the state consumer education division using Water Watch as a demonstration topic.

### **Implementing Water Watch**

To implement the program, state Extension specialists in family housing and in public affairs conducted a leadership and subject matter workshop. This was followed by five district training meetings involving the Housing, Energy, and Environment chair; the Citizenship, International, and Community Outreach chair; and an Extension agent in home economics from each county.

The district EHC chairs assumed leadership roles in these training meetings. Extension specialists and members of the 1983 Water Study Code Commission presented subject matter information. The training content included information about uses and water rights, assessing local situations, and other program planning information, including how to structure a forum.

Accurately assessing the local situation was critical to the success of the forums, since water supplies, needs, and uses, as well as the attitudes of people, vary across the state. In a few counties, the issue is such an emotional one that local Extension Homemakers felt they should not initiate any type of forum.

Support materials prepared for the programs were varied: leaders' guide, a leaflet, slide sets, and a continuous tape to use with a slide set for fair exhibits. Mass media efforts included radio scripts, newspaper articles, and an award-winning television public service announcement. The PSA was aired during the closing ceremonies of the Olympics.

### **Results**

Efforts with the Water Watch program were successful. Some 374 leaders in 187 clubs in 16 counties reached 16,093 individuals with some type of water conservation information. Many of these individuals were new to Extension educational programs.

In one county, 45 of the 60 people attending the forum had never attended an Extension activity. In another county, 67 volunteers gave the checklists to over 3,000 people near 22 polling places during the May 1984 primary election. The volunteers ran out of checklists at all locations. Two hundred of the returned coupons indicated 472 water use practice changes would be adopted.

As a result of Water Watch, Arkansas families are more informed on water issues in the state. A proposed comprehensive bill was defeated in the 1985 session and a bill requiring annual reporting of water usage was passed. The Soil and Water Conservation Commission was empowered to conduct water usage studies and develop guidelines for evaluating proposed interbasin transfer.

Leadership skills of volunteers and networking skills of county Extension faculty were reinforced through the involvement of both new audiences and, in several instances, community leaders who had not previously been involved in Extension program planning. Arkansas legislators have become more aware of the interests and concerns of family and environmental issues due to the Water Watch program.

And all involved have had the message reinforced that Extension is a source of information and education on many vital issues, in keeping with our mission of "helping people to help themselves." □



# The Impact Of No-Till and Lo-Till

## 38 Extension Review

*G. Morgan Powell  
Extension Liaison,  
National Association  
of Conservation  
Districts  
Conservation Tillage  
Information Center  
Fort Wayne, Indiana*

Many Extension specialists and agents have focused their education programs on conservation tillage in recent years. Following are a few which have had substantial impacts.

### **Delaware—A No-Till Leader**

The Conservation Tillage Information Center's acreage survey shows Delaware as the leading no-till state, with nearly 60 percent of the corn, 95 percent of the double crop soybeans, and 23 percent of the full-season soybeans.

Extension Agricultural Engineer, Tom Williams, credits Delaware's no-till achievements to three factors: Extension foresaw the possibility of this new technology and responded with a demonstration program (begun in 1969) to meet the need ahead of the demand; team effort between experiment station scientists and Extension specialists from all college of agriculture departments enabled development of workable conservation tillage crop systems, especially for no-till; and the timing was right—the 1973 energy crisis gave a major boost to early adoption of no-till.

"About 1981, the emphasis shifted from row crops to solid seeding," Williams says "when some soil conservation districts leased no-till drills for demonstration of solid seeding for small grains and soybeans." County agents and Soil Conservation Service technicians have aided districts to insure accurate drill setting and successful cropping. Experiment station scientists continue to compare and evaluate different tillage systems for row crop and small grains.

### **Minnesota Field Demonstrations**

"Field demonstrations with farmer cooperation and equipment were essential for a 93 percent increase in ridge-till corn in 2 years (1983–85)," explains John Moncrief, Extension agronomist with the University of Minnesota. This program has become popular with farmers because they can relate well to the farm-size plots planted and harvested by the cooperator with normal farm machinery.

In local planning, the county Extension agent, Soil Conservation Service District conservationist work together with an innovative farmer cooperator. They look for a successful conservation tillage cooperator with the necessary equipment. Sequences of crops common to the area (corn/soybean, corn/alfalfa, and small grains) are planted with three to five treatments, including disk chisel, ridge-tillage, and no-till.

The Minnesota conservation tillage program is multidisciplinary involving specialists in all departments and cooperation with SCS and ASCS. Success of ridge-till adoption has been helped by rapid growth of farmer ridge-till associations where farmers share success and failures. Extension tracks production inputs and yields so a statistical analysis can be done to show whether one tillage system is more profitable than another.

### **Oklahoma Lo-Till Spin-Off**

"Conservation tillage programs aimed at continuous wheat in the plains should only be undertaken by the adventurous," advises James Steigler, Extension agronomist at Oklahoma State University. Several specialists who saw a need began Oklahoma's lo-till program in 1980. They were encouraged by grants in 1981–84 from the Oklahoma Wheat Commission.

The adoption of lo-till for continuous wheat from this educational program has not been as successful as originally hoped. The decline in wheat prices, lack of herbicide choices for winter annual grasses in wheat, and the fact that crop rotations generally do not compete with weeds are contributing factors.

Project accomplishments to date include: A 30- to 40-percent small-grain residue cover which usually requires no special planting equipment; the possibilities of conservation tillage brought to the forefront in Oklahoma; the spinoff of conservation tillage for soybeans; and strengthened research effort on conservation tillage.

Though lo-till will work, it is not economical for continuous wheat right now. A change in attitude toward rotations or new herbicides could make the adoption of lo-till wheat an economic positive.

### **Ridge-Till With Furrow Irrigation**

In Nebraska, ridge-till corn acreage nearly tripled from 1983 to 1985. "Ridge-till has been a component of the Extension Conservation Tillage Education Program since 1979," explains Elbert Dickey, Extension agricultural engineer, University of Nebraska. Dickey gives much credit for adoption success to research on tillage systems since 1976 at the South Central Research and Extension Center, Clay Center. Fifty percent of the systems researched there contain a form of ridge planting.

"Ridge tillage fits with furrow irrigation like a glove fits the hand," Dickey says. "It is a natural to use ridge-till on furrow irrigated row crops because operators already create a ridge in the normal process of preparing for furrow irrigation."

Dickey believes that ridge-till is especially economical on furrow irrigated corn because it eliminates preplant tillage, uses less herbicides by banding, and requires no more cultivation than is normally used to build ridges for irrigation.

Dickey, in summing up Nebraska's experience with conservation tillage says, "Do not be content with what you are doing. There is always a better way." □

# Water Crisis In The West

Extension Review 39

Many consumers take water for granted. They continue to believe that water is abundant, clean, safe, and inexpensive. However, in Oklahoma, population growth and changes in lifestyle have increased water usage. As a result, water isn't so abundant, clean, safe, and inexpensive any more.

Over the past 2 years, Extension specialists and university researchers at Oklahoma State University have pooled their efforts while educating nearly 50,000 people about water conservation. The National Extension Committee of the Joint Council identified the need for clientele education about water quality and quantity and the importance of water conservation.

Many Oklahoma communities have been facing the realities of limited water supply, pollution, and worn-out water distribution systems. And, they've been learning the real meaning of such terms as "water resources management" or "water conservation management."

Water conservation education, including educational programs and installation of water devices, seemed to work in Oklahoma when people were experiencing a real crisis. But once the crisis was over, many consumers reverted back to former water usage behavior unless they were frequently reminded of the benefits that come from water conservation efforts.

At Oklahoma State University, researchers have been trying to overcome this problem for the last 10 years. A University Center for Water Research (UCWR) coordinates scientific and empirical research concerning water quality and works with the university to pass on the information to consumers.

## Study Grant

In 1981, the College of Home Economics at Oklahoma State University received a study grant from the University Center for Water Research. Researchers wanted to identify effective ways that small water suppliers could encourage consumers to reduce water consumption without increasing water rates. In addition, the researchers wanted conservation practices to be easy and inexpensive.

The college chose a small rural Oklahoma water district to use as a study sample. Researchers wanted to discover if residents of the district used less water as a result of water conservation education and use of water saving devices.

The researchers worked with Extension housing specialists to develop educational materials. These materials were mailed to residents every 2 weeks for 3 months. An evaluation indicated that 20 percent of the residents reduced the amount of water they used, simply as a result of the educational material they received in the mail.

Nearly half of the residents who received the material plus water saving devices reduced water usage.

In 1984, as a result of favorable response from that water district, Extension home economists decided to conduct another pilot study with a small rural community that has water quality and quantity problems.

## Conservation Pilot Study

Each of the households in Yale, Oklahoma, received water saving devices—free of charge—to install in the shower and toilet. In addition, water conservation educational materials were mailed to residents with monthly water bills for 6 months.

At the end of 6 months, residents completed a questionnaire that required them to compare their meter readings before and after the study. The response showed that educational materials and water devices were effective in lowering water consumption in several households.

The next year, state specialists decided to offer water conservation education materials to Extension staff in counties where water problems existed. A task force developed strategies to implement the water education program. From the work of the task force, a training manual was developed for county home economists' use. Ten counties decided to participate.

Target audiences reached included 4-H youth, school children under 10 years of age, Extension Homemakers' councils and clubs, employees at worksites throughout the counties, and water policy decisionmakers and community leaders.

## Promoting Awareness

In addition, home economists promoted water conservation awareness through television public service announcements, newspaper stories, and radio interviews.

Water continues to be a problem in Oklahoma, but because of this Extension education effort, people are more aware of the problem and what they can do to conserve Oklahoma's water.

Some people have even cut back on water usage. Follow-up reports show clientele reached by county home economists have reduced water use by an average of 10 gallons a person and saved a total of \$27,000.

For more information about the water conservation program, or to receive an educational training manual titled, "Water Conservation: A Community Based Program," contact:

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(Retired)  
and  
Marla Barnes  
Extension Agricultural  
Information Officer  
Department of  
Agricultural  
Information  
Oklahoma State  
University, Stillwater

# Cooperative Extension System



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## The Cooperative Extension System Logo: Description and Usage

Our new logo is a striking, graphic triangle which symbolizes the strong, equal partnerships within the Cooperative Extension System — federal, state, and county, and Extension, research, and the private sector — and emphasizes their synergistic relationships. The logo will serve as the Cooperative Extension System "brand" or identity, signifying a mark of excellence in Extension education.

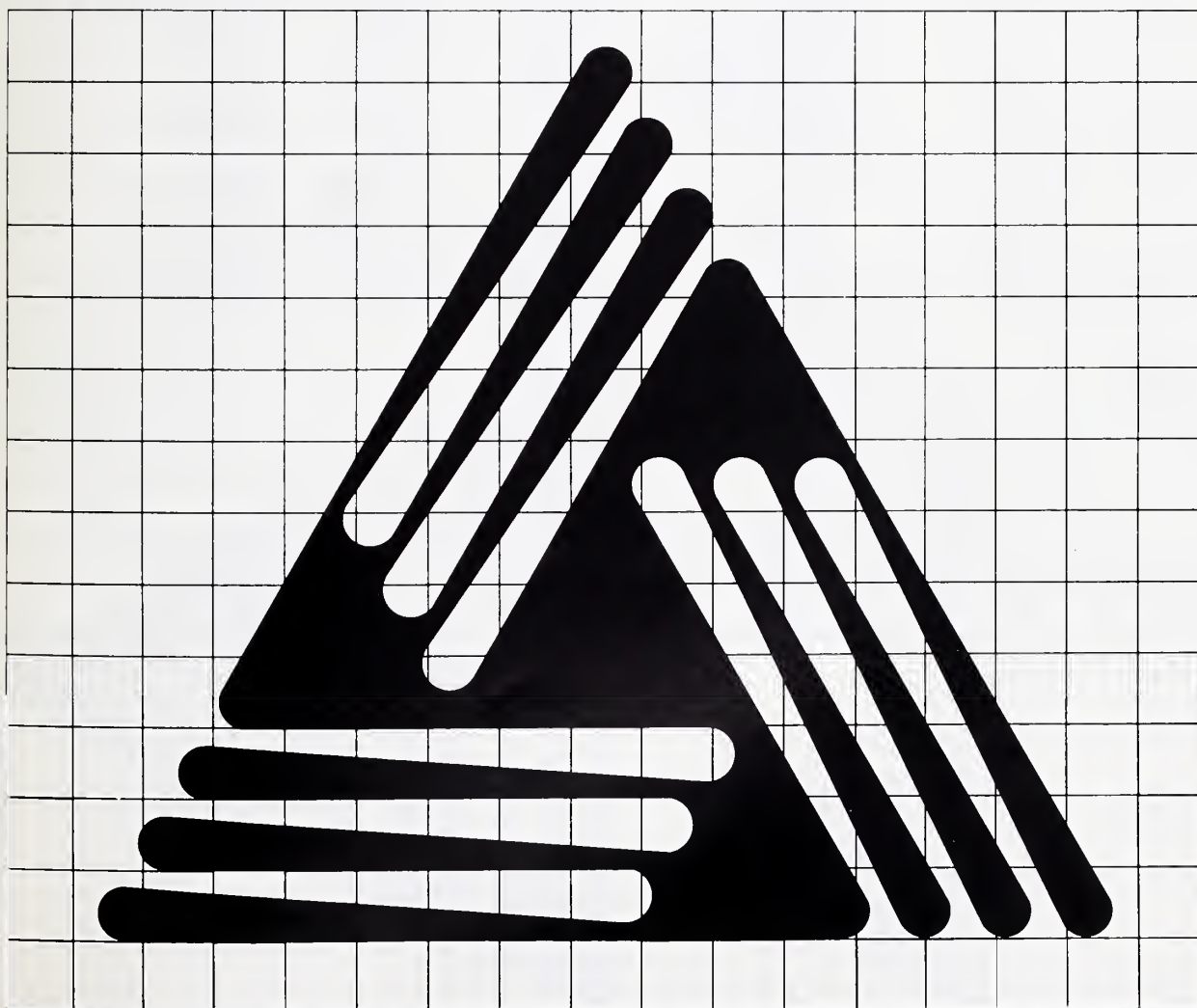
The triangle, also a sign of knowledge and change, emphasizes the vital role of Cooperative Extension in the food and agricultural sciences as a dynamic change agent and knowledge and technology base.

The logo should be applied as an identification element. As often as possible, it should appear next to the name "Cooperative Extension System" or the name of the State

Extension Service it represents. The typeface recommended is Helvetica Medium Italic, flush left and rag right. The integrity of the complete logo shall be maintained in all uses. Additions and deletions to the logo are not permitted.

To maintain clear identification, the logo shall always appear proportionally isolated from other elements such as titles or graphic devices. It shall not be obscured by intersecting lines, shadows, or screens, or reproduced against strongly patterned backgrounds that would tend to impair its recognizability.

### Logo With Superimposed Grid for Use in Making Non-photographic Enlargements



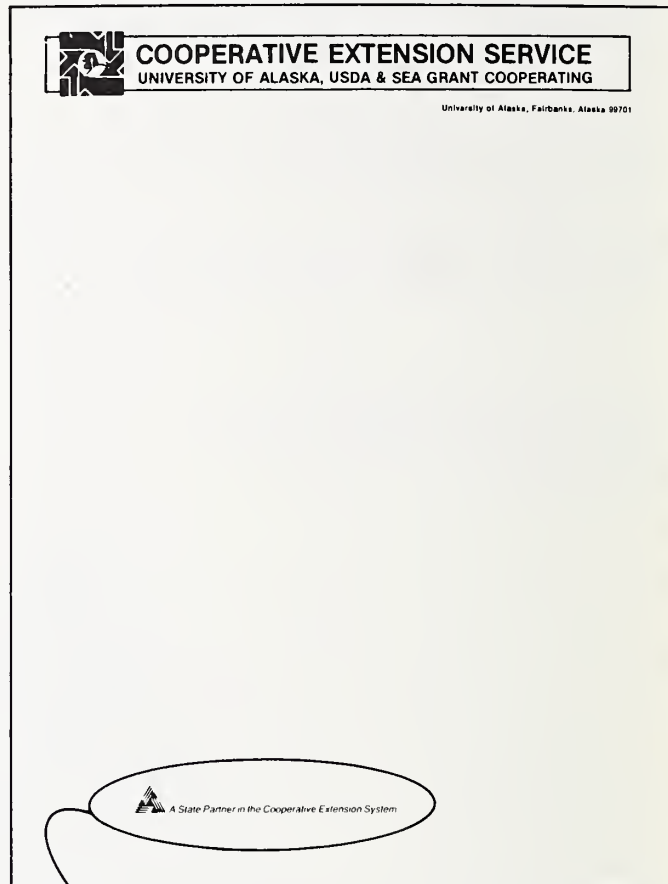
## Use of Logo on Stationary

### State Using Extension Logo Only



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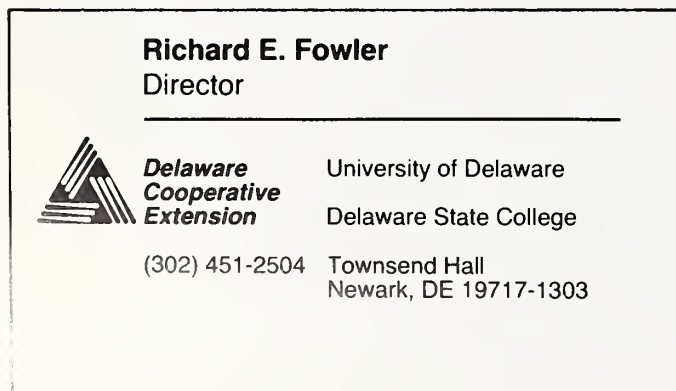
### State Using Extension Logo in Conjunction With Existing State Logo



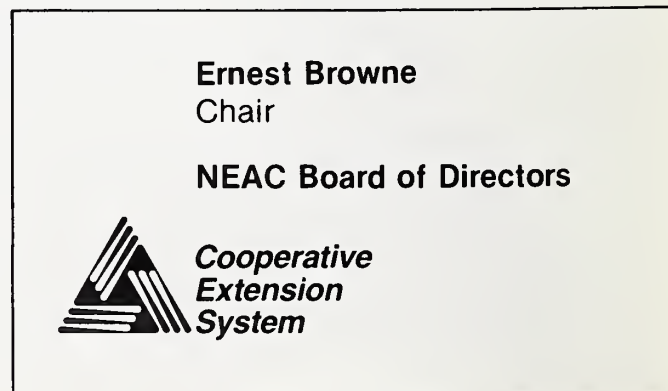
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### Personal Card

The following format is recommended for individuals wishing to use the logo in a personal card.



### Name Tag



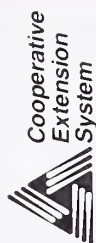
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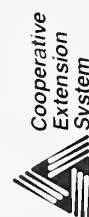
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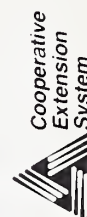
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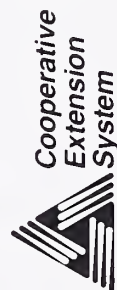
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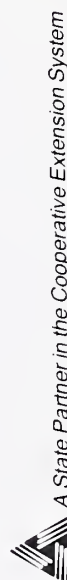
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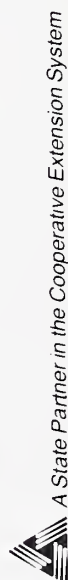
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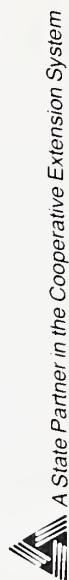
## Cooperative Extension System



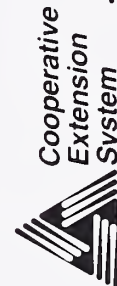
# A State Partner in the Cooperative Extension System



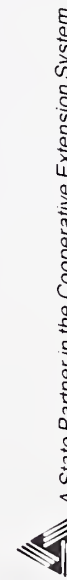
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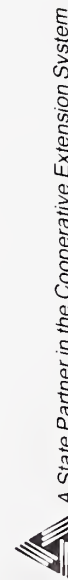
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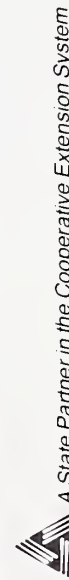
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United States  
Department of Agriculture  
Washington, DC 20250

OFFICIAL BUSINESS  
Penalty for private use, \$300

FIRST-CLASS MAIL  
POSTAGE & FEES PAID  
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Permit No. G-268